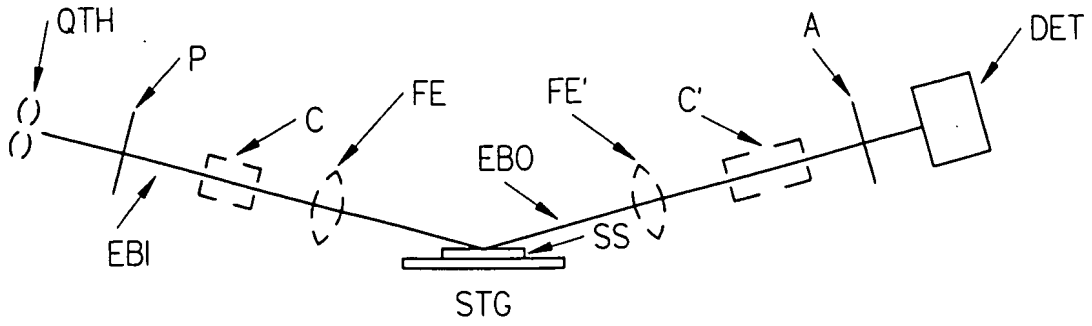
QTH
P
C
FE
FE'
C'
A
DET
EBO
EBI
SS
STG

FIG. 1a

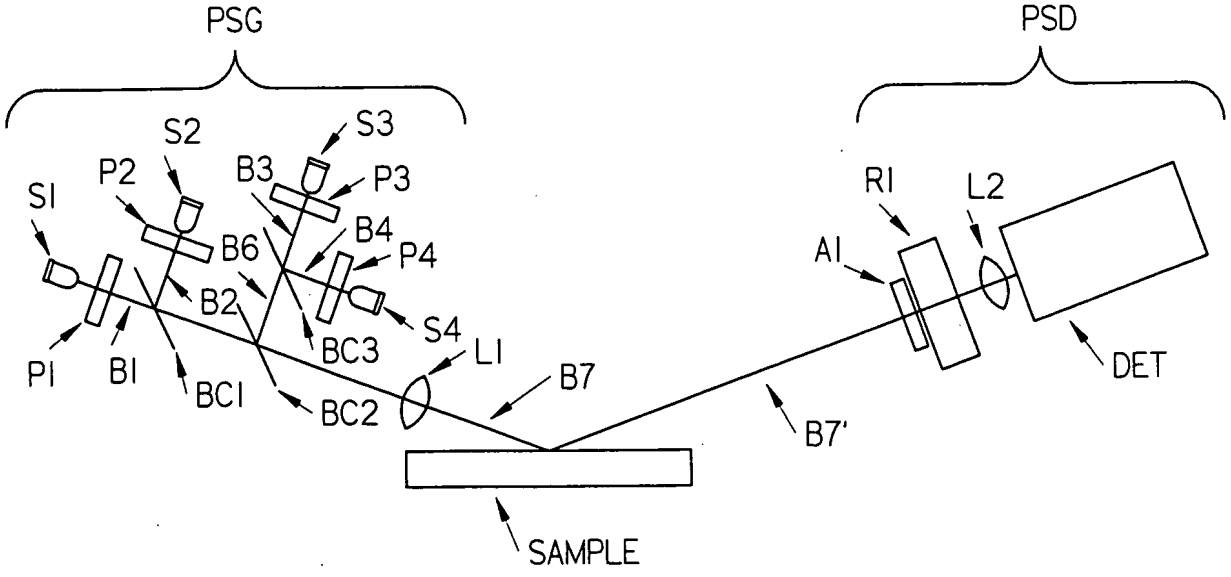
PSG
PSD
S2
S3
P2
B3
P3
SI
B4
B6
P4
B2
S4
BC3
LI
PI
BI
BCI
BC2
B7
B7'
RI
L2
AI
DET
SAMPLE

FIG. 1b

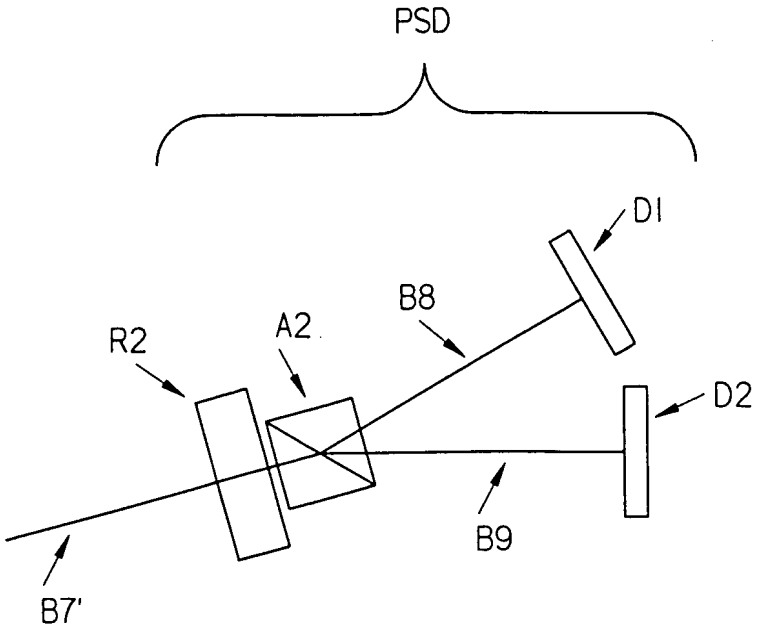
PSD
D1
B8
A2
R2
D2
B9
B7'

FIG. 1c

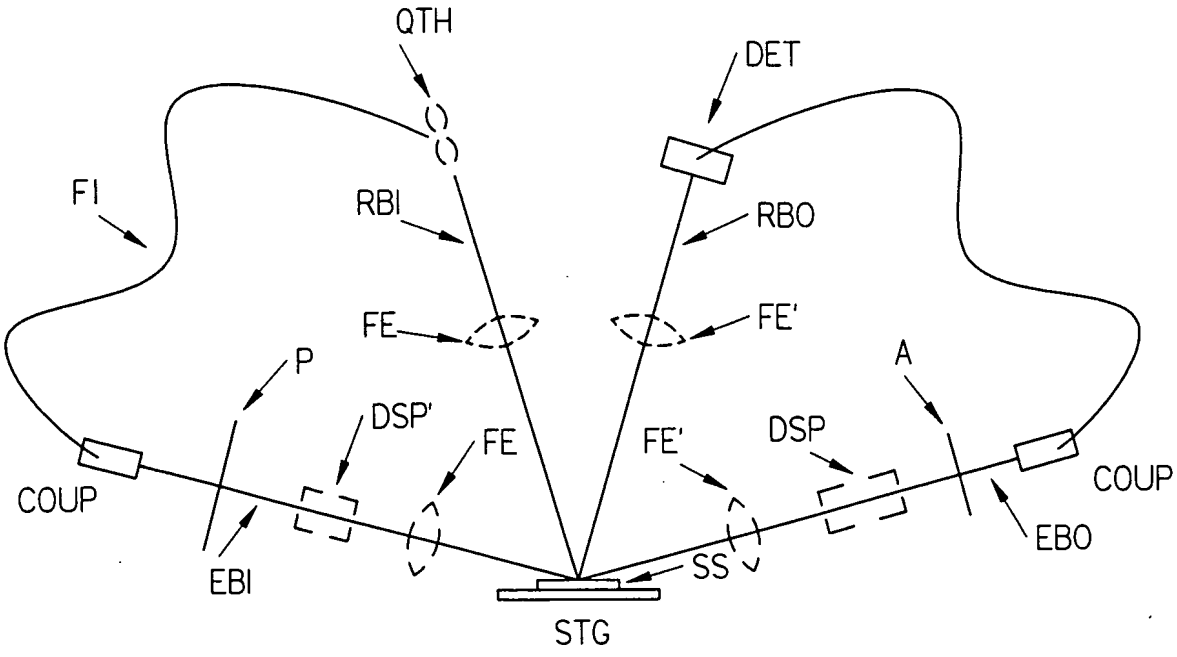
QTH
DET
F1
RBI
RBO
FE
FE'
P
A
DSP'
FE
FE'
DSP
COUP
COUP
EBI
EBO
SS
STG

FIG. 2a

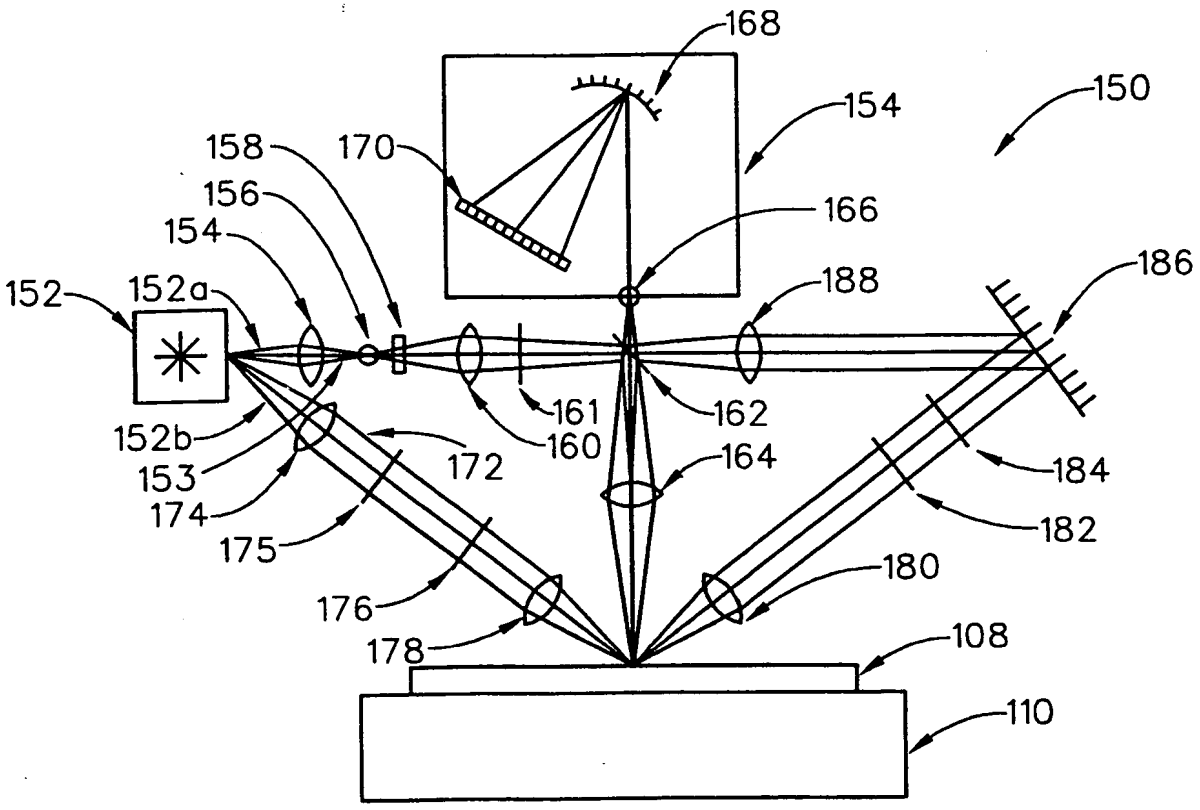
168
154
150
158
170
156
166
154
186
152
152a
188
161
162
152b
160
172
164
184
153
174
182
175
180
176
178
108
110

FIG. 2b

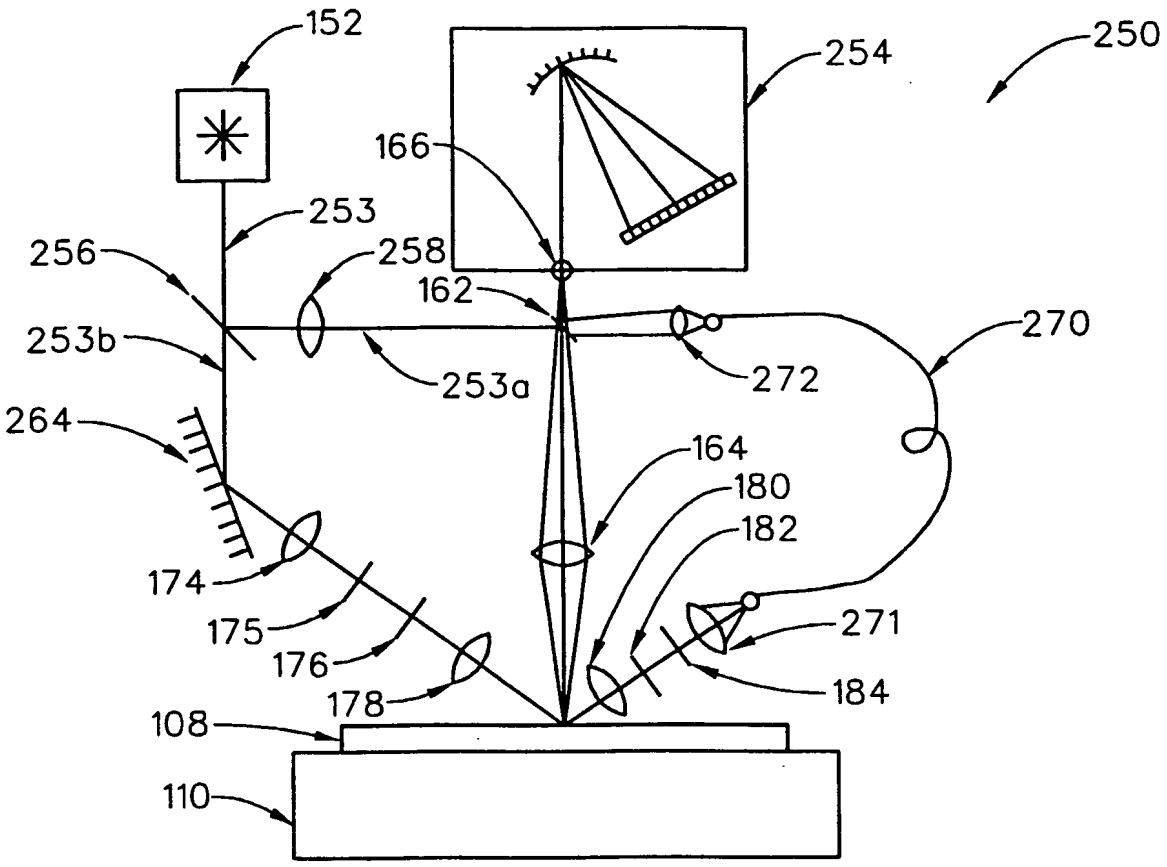
152
254
250
166
253
256
258
162
253b
270
253a
272
264
164
180
182
174
271
175
176
184
178
108
110

FIG. 2c

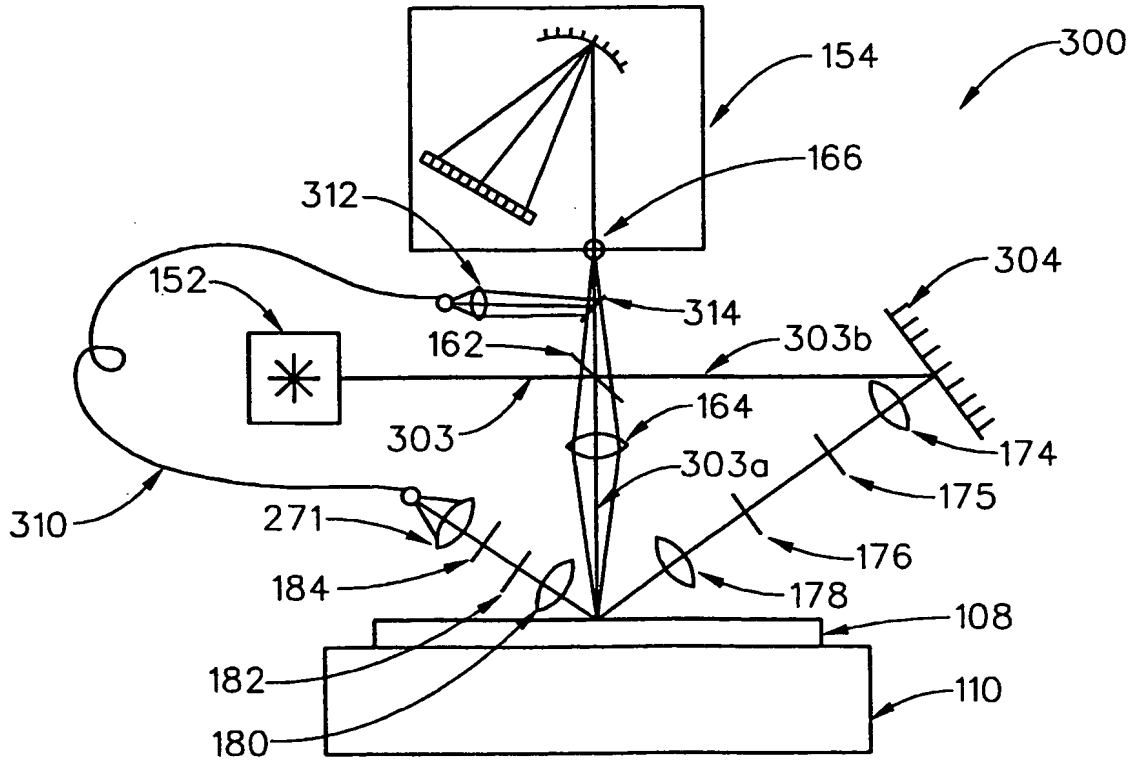
154
300
166
312
304
152
314
162
303b
164
303
174
303a
175
310
271
176
184
178
108
182
110
180

FIG. 2d

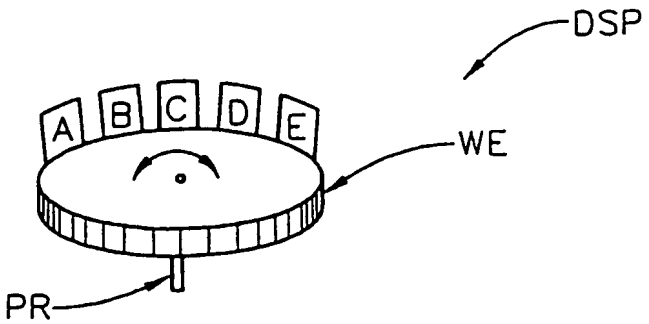

FIG. 3a

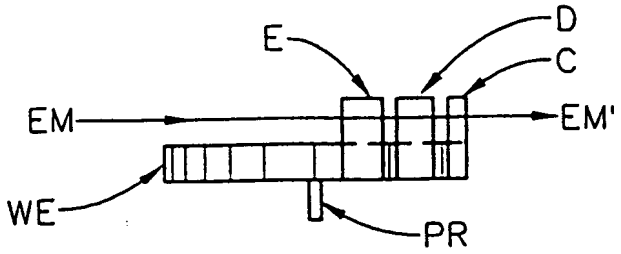

FIG. 3b

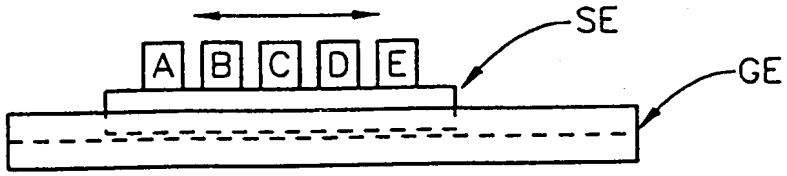

FIG. 3c

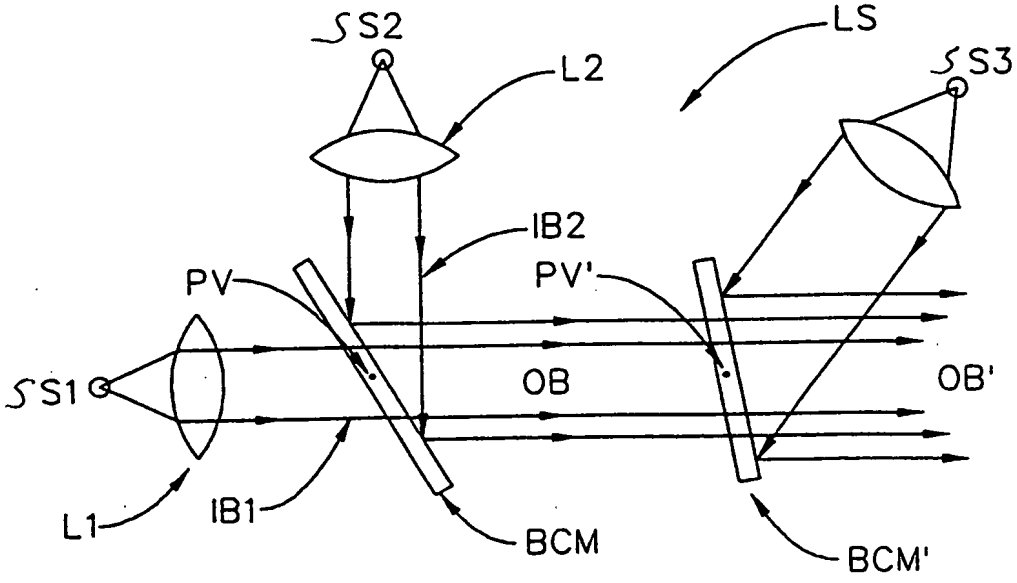

FIG. 3d1

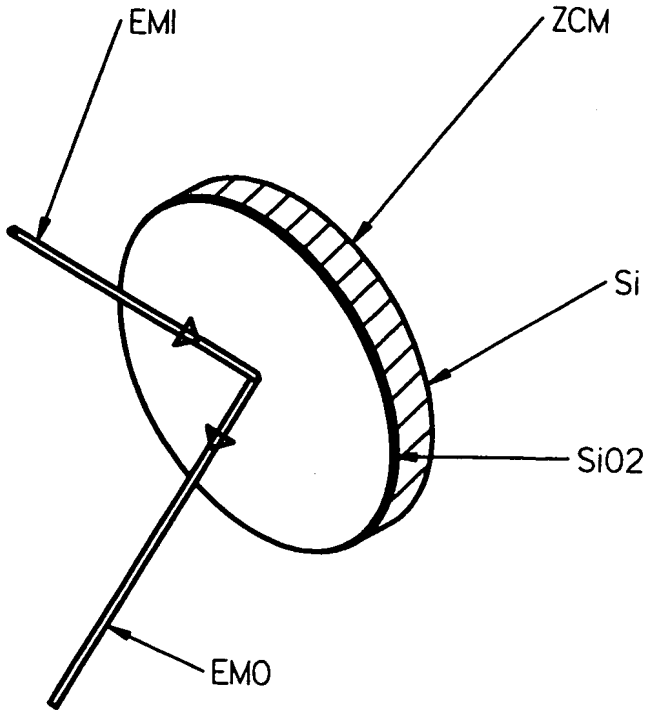

FIG. 3d2

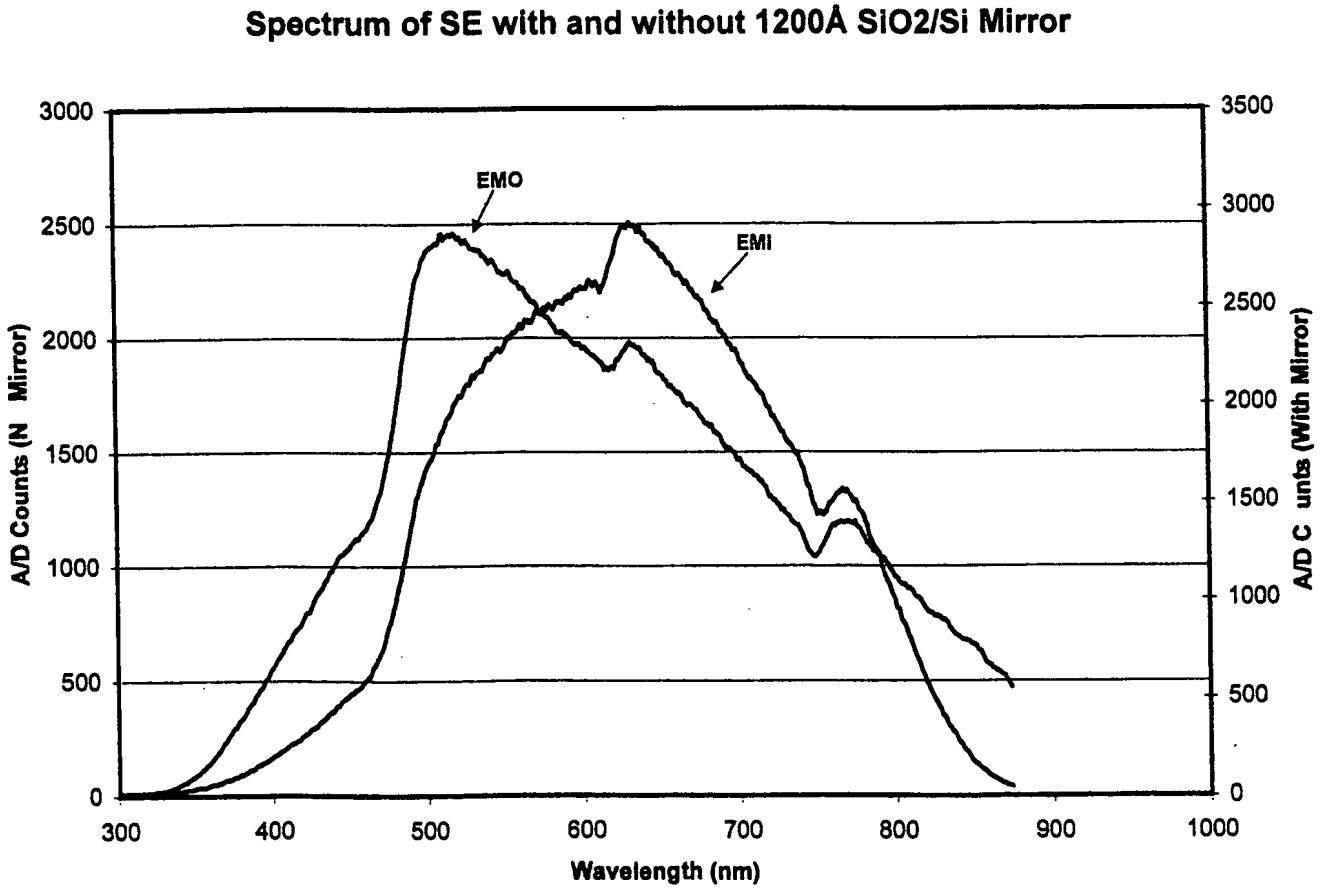

FIG. 3d3

Providing a sample system investigation system comprising:

a) a plurality of electromagnetic radiation s urces, each thereof optionally having polarization state setting means functionally associated therewith;

b) a means for accepting at least two electromagnetic beams which approach along different loci, and providing an electromagnetic beam which exits therefrom along a single locus;

c) a stage for supporting a sample system;

d) at least one detector system;

e) computation means;

said at least first means for accepting at least two electromagnetic beams which approach along different loci, and providing an electromagnetic beam which exits therefrom along a single locus, being positioned with respect to at least two of said plurality of sources of electromagnetic radiation such that a beam of electromagnetic radiation from either thereof, when it is energized, enters thereinto and emerges therefrom along a locus which is directed toward a sample system placed on said stage for supporting a sample system; said at least one detector system being positioned to intercept a beam which emerges from the sample system on said stage for supporting a sample system after said beam interacts therewith.

Sequentially energizing at least two of said sources of electromagnetic radiation and accumulating data from said at least one detector system.

Providing a mathematical model of the sample system and by simultaneous mathematical regression onto said data sets, evaluating parameters in said mathematical model.

FIG. 4a

Providing a spectroscopic ellipsometer system comprising:

a) a plurality of electromagnetic radiation sources, each thereof optionally having polarization state setting means functionally associated therewith;

b) a means for accepting at least two electromagnetic beams which approach along different loci, and providing an electromagnetic beam which exits therefrom along a single locus;

c) a stage for supporting a sample system;

d) at least one detector system;

e) computation means;

said at least first means for accepting at least two electromagnetic beams which approach along different loci, and providing an electromagnetic beam which exits therefrom along a single locus, being positioned with respect to at least two of said plurality of sources of electromagnetic radiation such that a beam of electromagnetic radiation from either thereof, when it is energized, enters thereinto and emerges therefrom along a locus which is directed toward a sample system placed on said stage for supporting a sample system; said at least one detector system being positioned to intercept a beam which emerges from the sample system on said stage for supporting a sample system after said beam interacts therewith.

For each of at least two ellipsometrically distinguished sample systems, obtaining at least one multi-dimensional data set comprising intensity as a function of wavelength and as a function of a plurality of polarization states of a beam of electromagnetic radiation sequentially provided by said plurality of sources of polychromatic electromagnetic radiation.

Providing a mathematical model of the ellipsometer system, including provision for accounting for the polarization state of a beam of electromagnetic radiation provided by said sources of polychromatic electromagnetic radiation utilized.

By simultaneous mathematical regression onto said data sets, evaluating parameters in said mathematical model.

FIG. 4b

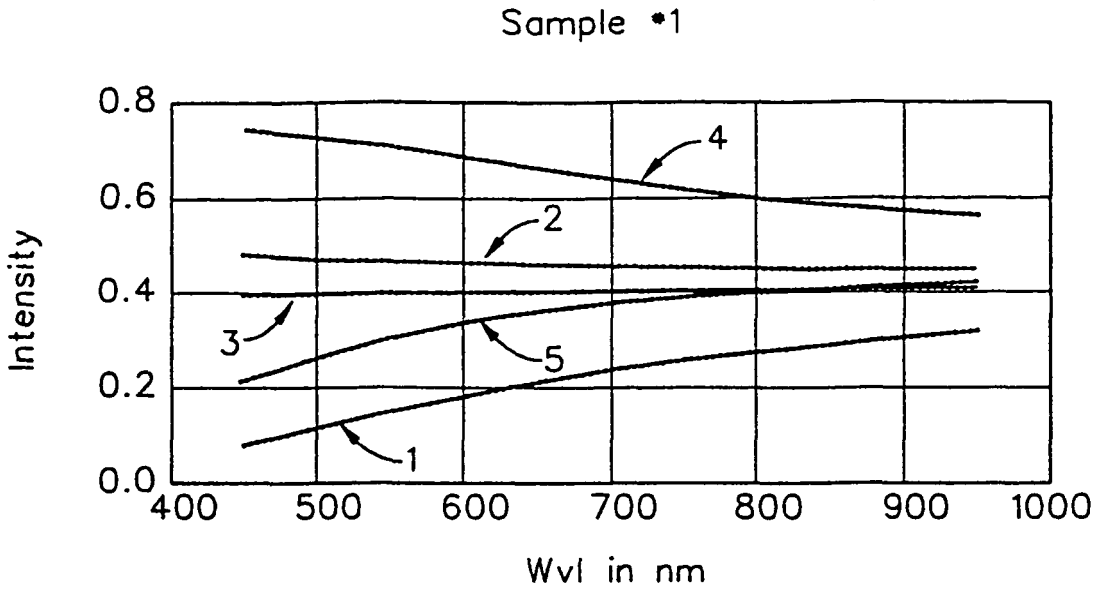
Sample *1
0.8
0.6
0.4
0.2
0.0
Intensity
400
500
600
700
800
900
1000
Wvl in nm
1
2
3
4
5

FIG. 5

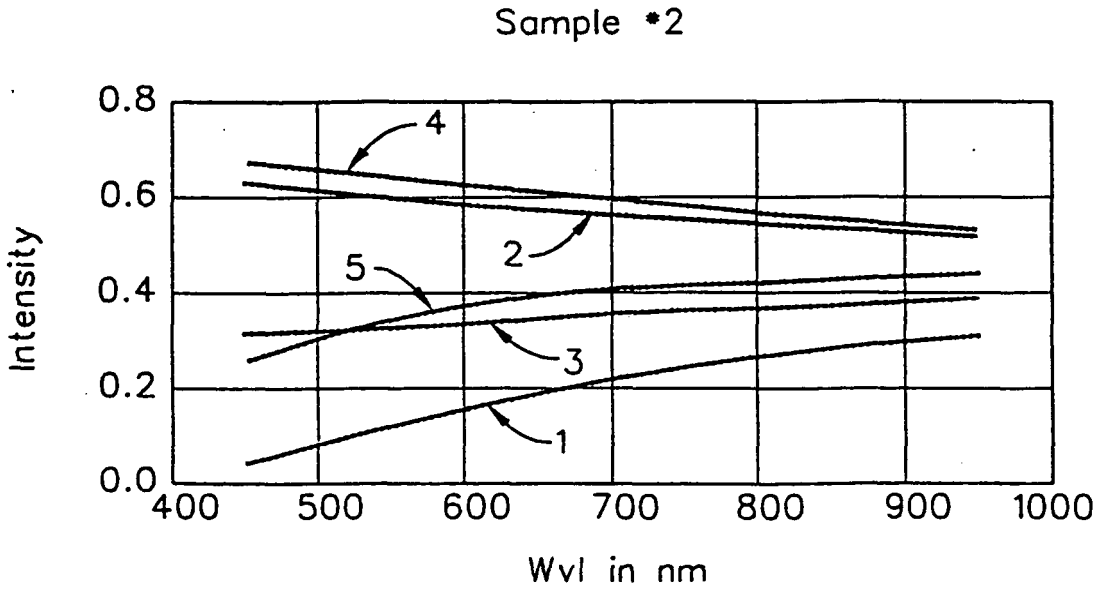
Sample *2
0.8
0.6
0.4
0.2
0.0
Intensity
400
500
600
700
800
900
1000
Wvl in nm
1
2
3
4
5

FIG. 6

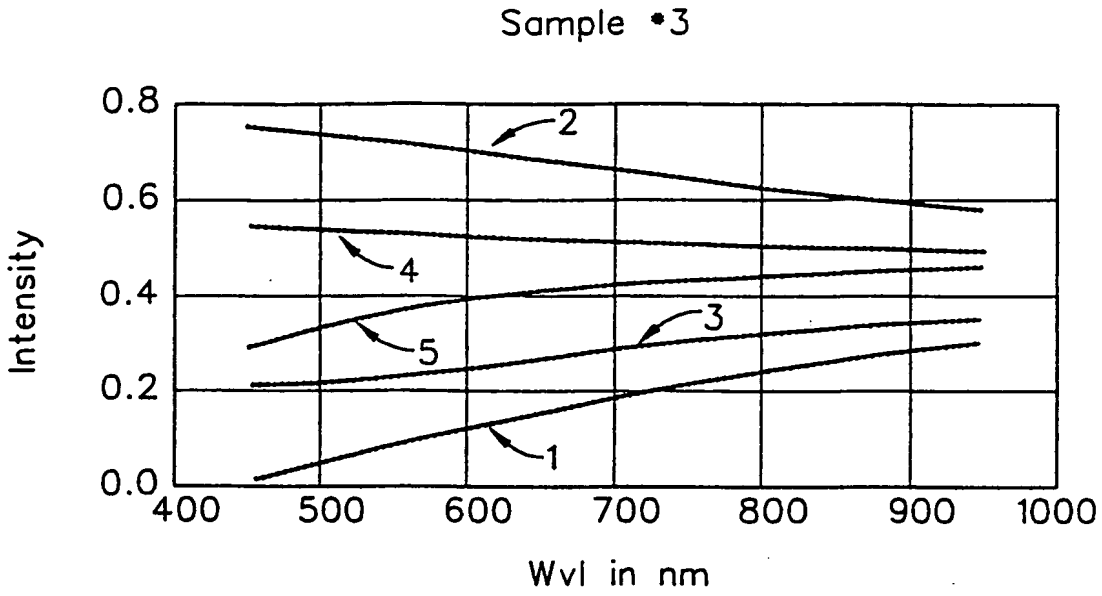
Sample *3
0.8
0.6
0.4
0.2
0.0
Intensity
400
500
600
700
800
900
1000
Wvl in nm
1
2
3
4
5

FIG. 7

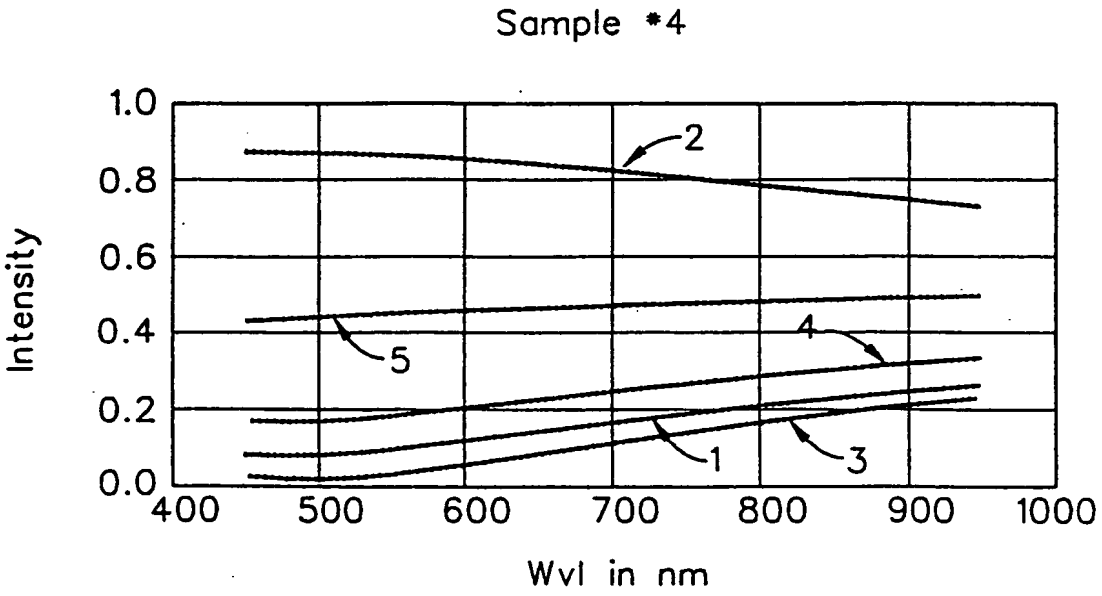
Sample *4
1.0
0.8
0.6
0.4
0.2
0.0
Intensity
400
500
600
700
800
900
1000
Wvl in nm
1
2
3
4
5

FIG. 8

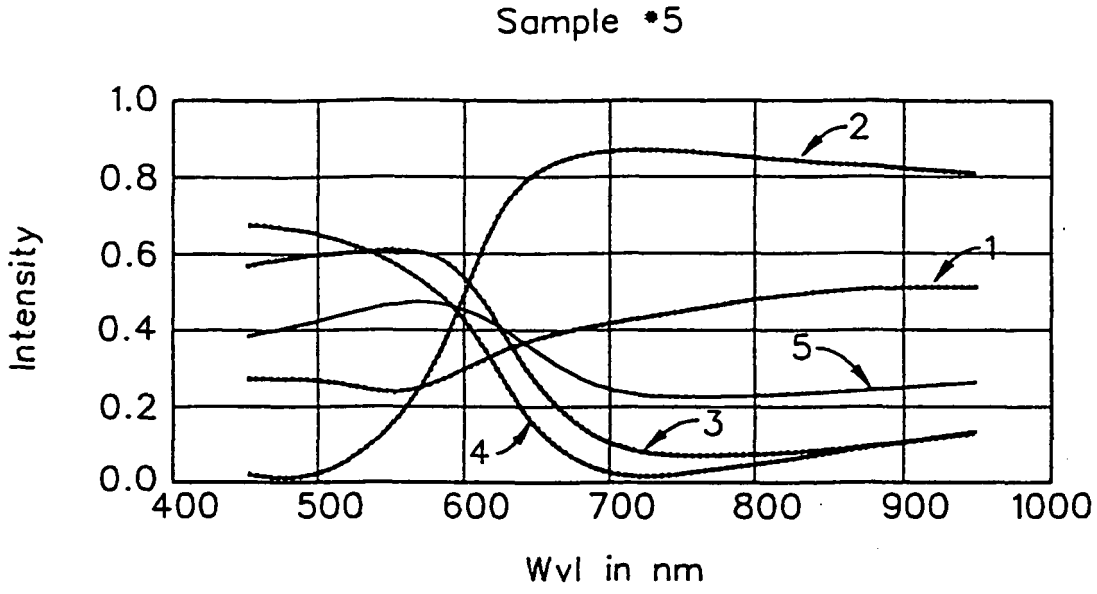
Sample *5
1.0
0.8
0.6
0.4
0.2
0.0
Intensity
400
500
600
700
800
900
1000
Wvl in nm
1
2
3
4
5

FIG. 9

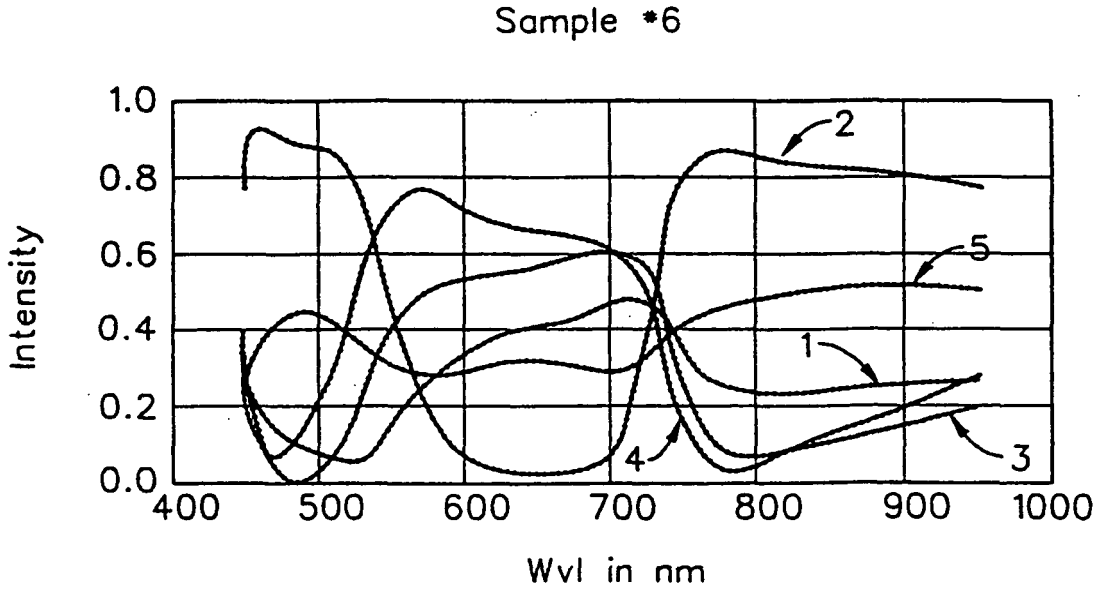
Sample *6
1.0
0.8
0.6
0.4
0.2
0.0
Intensity
400
500
600
700
800
900
1000
Wvl in nm
1
2
3
4
5

FIG. 11

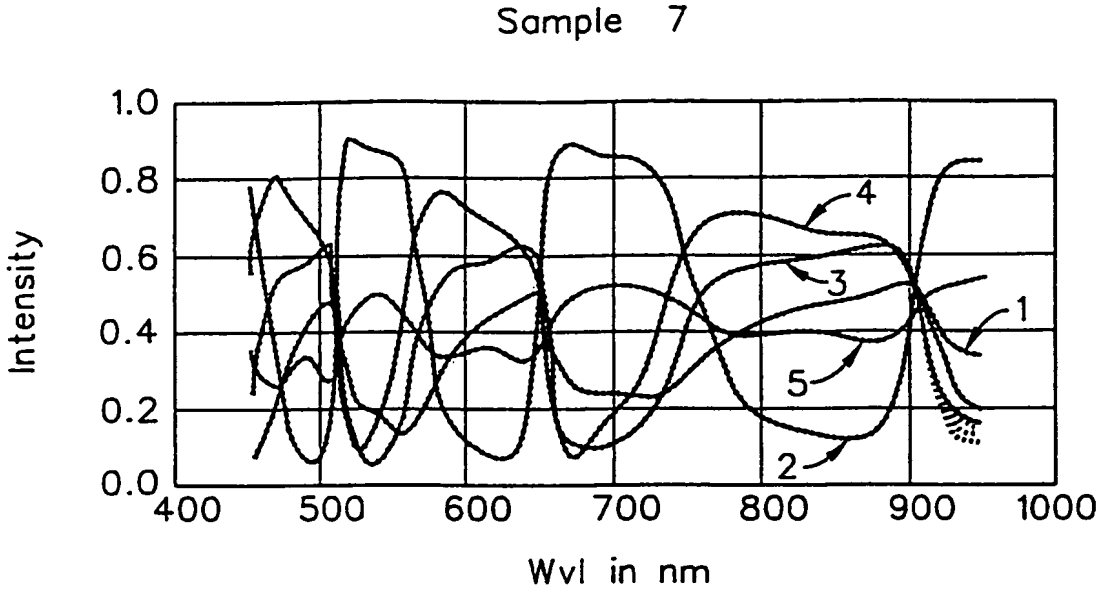
Sample 7
1.0
0.8
0.6
0.4
0.2
0.0
Intensity
400
500
600
700
800
900
1000
Wvl in nm
1
2
3
4
5

FIG. 10

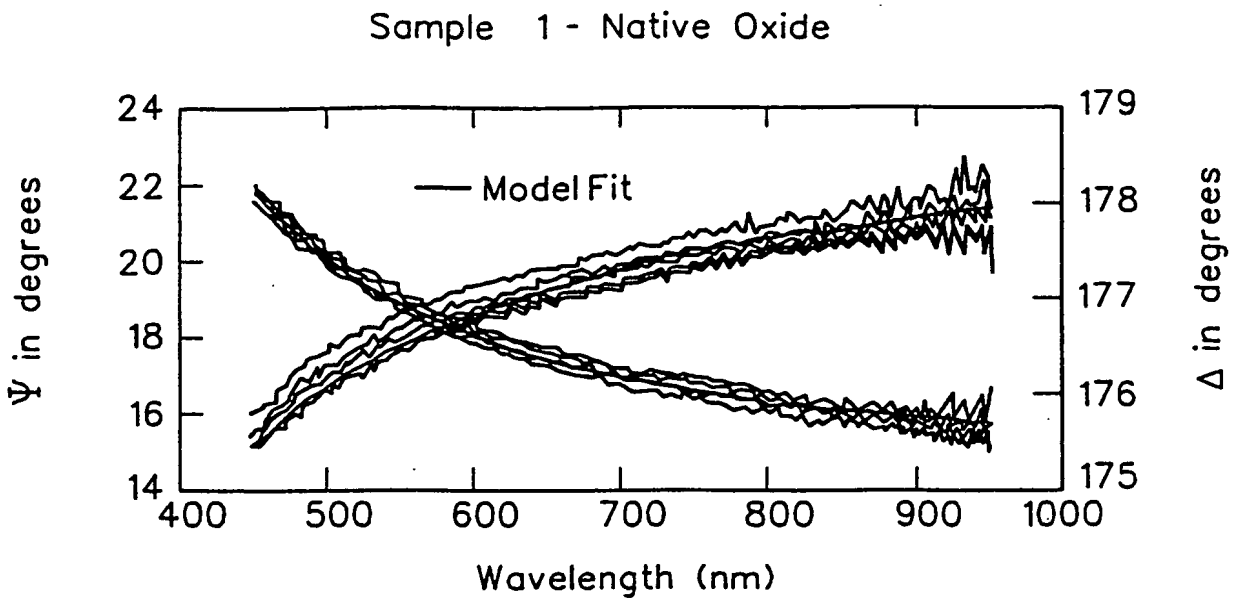
Sample 1 - Native Oxide
Ψ in degrees
Δ in degrees
Model Fit
24
22
20
18
16
14
179
178
177
176
175
400
500
600
700
800
900
1000
Wavelength (nm)

FIG. 12

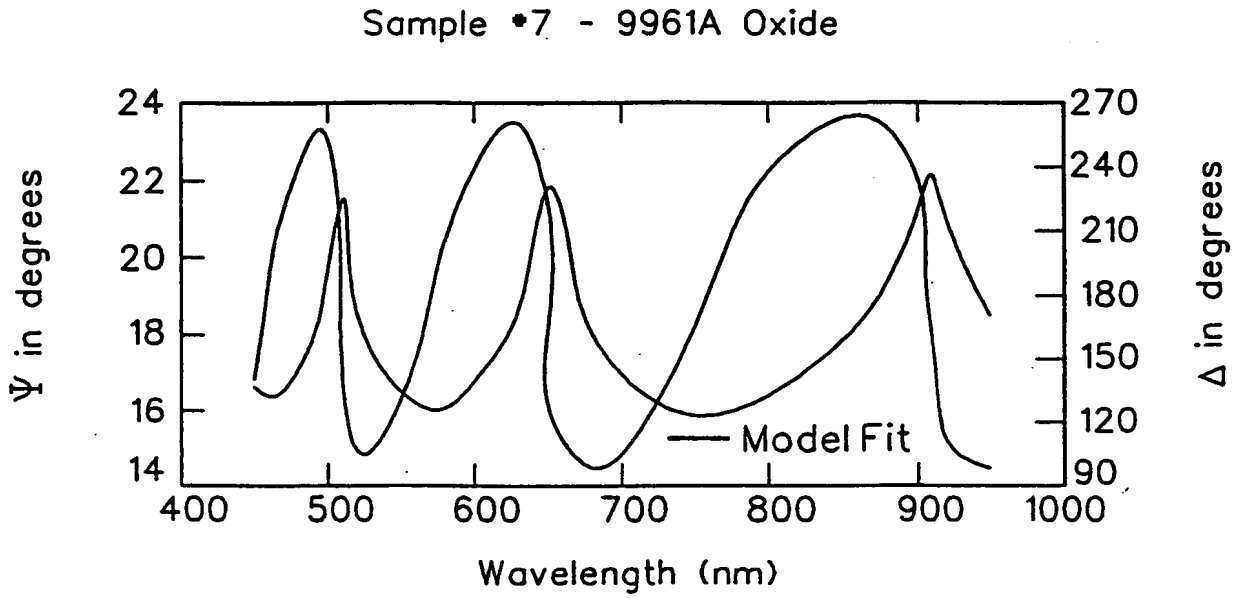
Sample *7 - 9961A Oxide
Ψ in degrees
Δ in degrees
Model Fit
24
22
20
18
16
14
270
240
210
180
150
120
90
400
500
600
700
800
900
1000
Wavelength (nm)

FIG. 13